the fauna, but also of its derivation from some pre-existing fauna in those islands. Much other zoological matter is to be found in this volume, though only a portion of the collections are here described. We are informed, however, that a great deal of systematic work still remains for the naturalist in the Bermudas, and Dr. Uhler, in respect of the insects, avers that much arduous collecting, particularly of the less conspicuous kinds, is still needed.

I do not know whether any argument for the considerable antiquity of the Bermudas from the character of the fauna has been advanced before. At all events, Prof. Heilprin's valuable suggestion opens up a line of inquiry in the case of coral islands generally, which might be pursued with profit. From investigations of the coral phenomena alone, I arrived at the conclusion that Keeling Atoll has a life-history of from 15,000 to 20,000 years, and that it is now in the last quarter of its existence. If this coral island is a type, then atolls must possess a high antiquity; and, taking our cue from Prof. Heilprin, we may ask whether, in the fauna and flora of a typical Pacific or Indian Ocean atoll, there is anything to suggest that they are derived from a pre-existing order of things. Confining ourselves to the flora, we find that oceanic atolls are mostly characterized by Hemsley as possessing no endemic element amongst their plants. Yet some of these large atolls must have once engirt, according to the theory of subsidence, a mountainous island possessing an upland flora, and, as in the case of the Fijis, not a few peculiar species. The islands formed on the encircling reef, just like the coral islands that often front the shore of a mountainous island in the Western Pacific, would possess, in addition to the common littoral plants, a number of plants derived from the slopes of the adjacent island. How comes it, then, that, if these large groups of oceanic atolls mark the disappearance of mountain-ranges, we find no sign of the vanished upland flora amongst the common littoral plants that are now brought by currents, winds, and sea-birds to every atoll? The Island of Tahiti could hardly disappear beneath the ocean without leaving a Tahitian impress on the flora of the surviving atoll. A similar reflection often occurred to me whilst on the Keeling Islands.

In conclusion, I would remark that partisanship in matters of scientific dispute cannot affect the value of this work by an American naturalist on one of the oldest of British possessions. The book is illustrated with several beautiful phototypes of general views in the islands, as well as of the æolian formations and of the coast scenery; and seventeen lithographic plates accompany the zoological descriptions. H. B. GUPPY.

THE USEFUL PLANTS OF AUSTRALIA.

The Useful Plants of Australia (including Tasmania). By J. H. Maiden, F.L.S., F.C.S., &c. (London: Trübner and Co. Sydney: Turner and Henderson. 1889.)

ALTHOUGH designed in the first instance as a hand-book to the specimens in the Technological Museum at Sydney, this work in its present form is really a concise text-book treating of "all Australian plants which, up to the present, are known to be of economic value, or injurious to man and domestic animals."

The literature of Australian economic botany may be said to date from the Great Exhibition of 1851. Owing, however, to the unsettled nomenclature of Australian plants previous to the publication of the great "Flora Australiensis," by Bentham and Mueller, the properties of the same plant were often found described under numerous botanical names. The publication of the "Flora," and the subsequent issue of Baron Mueller's "Census of Australian Plants" (with annual supplements), have now rendered species names easily accessible to workers in all parts of Australia, and the ground is well prepared for such a publication as that which lies before us. It is a bulky volume of 700 pages, well arranged, well got up, and furnished with an excellent index of botanical names, and also one of vernacular names. As Mr. Maiden reminds us, this is the first attempt made to grapple with the economical botany of Australia. He has wisely followed Baron Mueller in all essential details of classification, and due credit is given throughout the book to this learned and indefatigable worker, now, the greatest living authority on all that relates to Australian vegetable life. The arrangement of subjects has been adopted as that found most convenient in the Museum. This is not, perhaps, the best arrangement for a text-book, as it involves considerable repetition of names and synonyms under each section; but on that point we are not disposed to quarrel with the author. It opens, with human foods, and food adjuncts; and these are succeeded by forage plants, drugs, gums, resins and kinos, oils, perfumes, dyes, tans, timbers, fibres, and it closes with plants having miscellaneous uses not previously enumerated. A glance at the book shows very clearly, that if we except timbers, a description of which occupies about one-half the contents, the economic products of Australia are not of extraordinary importance. It is noticeable that the northern parts, where the flora is reinforced by representatives from the Malayan Archipelago and Southern Asia, yield most of the plants possessing medicinal properties. The genus Eucalyptus, comprising more than 130 species, yields excellent timber, kinos, and essential oils, and probably the chief economic products of Australia derived from native plants. Mr. Maiden has brought together practically all that is known about the industrial application of "gum"-trees, but we cannot now attempt to follow him.

Eucalyptus Gunnii (a large plant of which grows in the open air at Kew) yields a sweetish sap converted by settlers into an excellent cider. This, and manna, from *E. viminalis* and *E. dumosa* are probably the only food products derived from Eucalyptus trees. In the production of Eucalyptus oil (from *E. amygdalin* and *E. globulus*), Australia, it appears, has powerful competitors in Algeria and California, where gum-trees have been largely planted during the last twenty years. In the latter country, a large quantity is available as a by-product in the manufacture of anti-calcaire preparations for boilers.

The widely-spread Acacias of Australia, locally known as wattles, are hardly less useful than the gum-trees. Owing to the immense number destroyed for the sake of the bark used in tanning, the wattles in some districts are said to be threatened with extinction. Some whose leaves are eaten by stock are also becoming scarce. To counteract these influences, systematic attempts have been

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made to plant wattles on a large scale. It is doubtful, however, whether, except in South Australia, such plantations will be ultimately successful. Gum arabic, of good quality, is yielded by various species of Acacia, but owing "to the great cost of unskilled labour in Australia, and the impossibility of utilizing the services of the aboriginals, it will never find its way into the world's market to any very great extent." Australian indigenous edible fruits, roots and leaves and stems, are apparently wisely left to the appreciation of "school-boys and aboriginals." Almost more important than food in a dry country is a constant supply of water. The aboriginal method of obtaining water from the fleshy roots of certain trees such as *Hakea leucoptera*, and from the stem of *Vitis hypoglauca*, is similar to that adopted in other countries, but Mr. Maiden has wisely given prominence to the fact, as the knowledge of it may be the means of saving the lives of many lost in the bush. Very few native Australian plants yield valuable fibres. The aboriginals appear to prepare their fishing-nets by chewing fibrous plants, and "this practice causes their teeth to be worn down to a dead level." In the same manner, we may add, the natives of Formosa prepare certain fibres for making clothes.

The best fodder grass of Australia is said to be *Anthistiria ciliata*, known as the "common kangaroo grass." There are several poison bushes (species of *Gastrolobium*, *Swainsonia*, and *Sarcostemma*) dangerous to stock so widely distributed as to render extensive tracts of country unoccupiable. These of late years have been reinforced by noxious weeds from other countries.

It is not to be supposed, however, that our knowledge of the economic uses of Australian plants is yet complete, and we are glad to learn that the author is actively engaged in observations that no doubt will be incorporated in a later edition. In the meantime, however, we cannot do better than commend this work as a most trustworthy guide in a handy form to the useful plants of Australia.

D. M.

MOUNT VESUVIUS.

Mount Vesuvius. A Descriptive, Historical, and Geological Account of the Volcano and its Surroundings. By J. Logan Lobley, F.G.S., &c. (London: Roper and Drowley, 1889.)

MANY people have been puzzled by the fact that there are so few English books on Vesuvius, especially of the descriptive type. The appearance of this work was looked forward to with ardent expectations, but it is doubtful whether it will fulfil them. Prof. Phillip's work was a remarkable one considering the short stay he made in Naples, but possessed those defects that all books must have which are written from little experience. Prof. Phillips wrote immediately after his visit. The first book of Prof. Lobley was prepared under similar circumstances, but apparently he has not re-examined the district for twenty years. Nearly every geologist on his visit to the type volcano of the world is attacked by a fever to write something about it—witness the 1300 or more books and articles in all languages referring to it—but a few months bring him safely through his complaint, and leave him satisfied that years of careful study on the spot will hardly qualify him to produce even a short description. This leads us to the main defects of the work, which spring from the author's want of personal observation, and the necessity of his obtaining information second-hand. Many recent authorities do not seem to have been consulted by Prof. Lobley. In consequence, he constantly makes statements that are incorrect or only partially accurate. Another fault to be found is the very incorrect and old-fashioned illustrations which would much bother a new-comer to the district with this work as a guide. Many of the crystal forms are incorrectly drawn, and in Plate xiv. dykes should not be represented as pipes branching out from the main chimney, but principally as radial sheets.

The accounts of the Phlegrean Fields, so far as they go, are very attractive, but lack that accuracy that a recent visit would have conferred. In describing Vesuvius, he mentions the library of vulcanology collected in the Naples section of the Italian Alpine Club, stating that 25,000 volumes are there preserved, which is more than three times the number. Neither will most people have had such a favourable experience of Vesuvian guides as Prof. Lobley. Yet altogether, the chapters on Vesuvius are the best part of the work, and are quite as much as a visitor with a couple of days to give to the mountain can comfortably absorb. The chapter on the geology of the volcano is clear and well written.

Unfortunately the book is spoiled—more perhaps than by anything else—by the author's views as to the causes of volcanic action. In the first place, the class of readers to whom the rest of the book appeals are not likely to possess sufficient physical and geological knowledge to be able to enter into the question, and to them chapter viii. is likely to prove a bore, and should they begin to peruse the book at this point, the effect will probably be that they will read no more. Even if it be supposed that the questions regarding the mechanics of the extrusion of igneous matter on the earth's surface are an easy matter of comprehension, the method of putting the subject into numbered paragraphs is much to be deprecated when the reader is not a specialist.

In the same way it is doubtful whether a description of rocks not occurring in the district is likely to be of use. Why mention the rare local rocks, "analcimite," "haüynophyre," "tholeite," &c., while "gabbro," "diorite," "syenite," are neglected?

The chapter on the minerals of Vesuvius is little more than a catalogue of every one that can possibly be raised to a species; some being obtained by dissolving saline crust in water, and allowing the solution to crystallize—a method that is hardly justifiable. Of far greater interest would have been a chapter on the general mode of occurrence, origin, &c., of the principal species, their characters being left to the systematic treatises on mineralogy.

The book is neatly got up and well-divided into separate chapters, so that the traveller, who will make most use of it, can easily turn up to a short account of any particular locality or subject. The language is clear, and not overburdened by petrological or other very learned words. Altogether, putting aside the above-mentioned blemishes, the work is likely to be of much use in leading travellers to observe for themselves one of the most interesting of geological phenomena.

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